The transport and dispersion of rafting vegetation in the Sacramento−San Joaquin Delta

#0053

Technical Panel Review

Proposal Name: The transport and dispersion of rafting vegetation in the Sacramento−San Joaquin Delta

Applicant Organization: Berkeley, California University of

Principal Lead Investigator(s):
Stacey, Mark

Amount Requested: $200,975

TSP Panel Summary of Findings:

Overall, this is a strong proposal that does an excellent job of addressing the specific needs of the PSP. It offers very good deliverables for a very reasonable amount of money. The advancement of knowledge on the movement of floating vegetation will boost the current knowledge and ability to manage floating invasive species. The approach is quite innovative and uses nothing but well−established, reliable, available, equipment. It is perhaps a concern, although trivial, that while the case for transport of other invasive species by rafts seems very plausible, it was not clearly documented in the proposal. Only a few citations were provided in the proposal about transport of aquatic nonindigenous species by vegetation rafts. But direct observations of such occurrences in the Delta were not presented or cited.

The panel recommends the following: 1. Broadening the relevance of this proposal by including the direct observations of other invasives by rafting vegetation would be a big plus for this proposal.

2. Letters of support from key groups involved in the management of the Delta might help to assure CalFED that the product of the investigator's work will fill a needed niche.

Relevance to PSP Topic Areas:

High

TSP Technical Rating:
Superior

TSP Funding Recommendation:
Fund

TSP Amount Recommended: $**200,975**

Conditions:

External Technical Review #1

Proposal Title: The transport and dispersion of rafting vegetation in the Sacramento−San Joaquin Delta

Proposal Number: 0053

Proposal Applicant: Berkeley, California University of

Purpose

Comments	**The goals of this project, to understand the mechanism of vegetation raft dispersion and model raft movement in the Delta, are clearly stated and consistent. Objectives, to produce a working model and evaluate limitations, and general research questions are well defined. In the narrative, informally, the investigaor hypothesizes about the possible effects of the interaction of wind and tides, and the influence of Delta geometry. The scale of the project is well considered. I would expect the results of the porposal's field study to add to the base of knowledge, and the project is likely to produce an interesting and new way to predict the movement of floating material (e.g. vegetative rafts) in the Delta.**
Rating	**Above Average**

Background

Comments	**The conceptual model is well stated, describing the physics of raft movement and the effects of Delta geometry. Experimental studies are described in adequate detail. Equations and numerical methods are well described. It is a little unclear whether the modeling will attempt to use the steady−state or dynamic solution of the equations, but I understand from the narrative that steady state will be used if raft velocity is determined (in the field?) to be**

	steady. This seems fine. I don't see where the investigator describes how the depth−averaged flow from common hydrodynamic models (e.g. DSM2) will be used to construct a lateral flow field, but I can see how it is planned. Some aspects of the concept and basis could be laid out more clearly, but the information is here.
Rating	Above Average

Approach

Comments	The approach seems well−designed and appropriate. Management and administration don't appear to be of much concern and are not listed specifically. Products are likely to be of value and will include measurements of stress on rafts, a more defined picutre of hydrodynamics in areas of the Delta, and evaluation of the effects of junctions on dispersion of floating material, and a model of vegetation raft transport and dispersion. This model will be easily adapted to use with standard hydrodynamic models. The investigator doesn't say that the model will be in the public domain − this should be a condition of funding. The investigator is active in Delta research and has plans for widespread and effective dispersion of the research results.
Rating	Above Average

Feasibility

Comments	The approach is fully documented and seems like it might be feasible. I have some concerns about the complexity and variability of local winds and the ability to adequately represent the wind fields in the modeling, but I have little field experience in the Delta. I would expect that local winds might be different than the prevailing west−east wind commonly found in the Delta and described in the project. But I expect that, in most cases, the difference is relatively small because of the lack of topography. I

	would estimate a good chance of success in producing a model of some value. The scale is consistent with objectives and within the grasp of the author.
Rating	Above Average

Budget

Comments	The budget is simple and clearly stated. The budgets for field work and application seem reasonable and adequate. The budget for model development seems a little excessive in comparison. All−in−all, the project seems worth the cost.
Rating	Sufficient

Relevance To CALFED

Comments	The author proposes to use field studies and numerical modeling to understand the transport and dispersion of vegetation rafts in the Delta. The author clearly makes the connection between vegetation rafts and the potential transport of invasive species in the Delta. In doing so, the author directly addresses a priority of the PSP to investigate a key factor in the distribution of invasive species of concern (waterweed and hyacinth). The author proposes to use modeling, a tool identified in the PSP as adding high value to the research. There is no interdisciplinary collaboration sited and no direct research of environmental water management in this research proposal. Integration and use of existing data are not the focus of this proposal. This is an interesting proposal that addresses a specific and narrowly defined aspect of the PSP. If the modeling is successful, results could be useful to imanagement of invasive species.
Rating	Above Average

Qualifications

Comments	**The author has a very good track record and much experience in field work and modeling hydrodynamics and transport in the Delta.**
Rating	**Superior**

Overall Evaluation Summary Rating

Comments	**Summary: Very good. This proposal addresses a specific aspect of the PSP. It lacks some of the breadth (e.g. interdisciplinary collaboration, environmental water management, use of historic data) that I read into the PSP. Nevertheless, the proposal is well defined and could produce interesting results that would help in management of invasive species and understanding the transport of floating material in the Delta. I believe that the transport and dispersion model developed in this proposal should be in the public domain.**
Rating	**Above Average**

External Technical Review #2

Proposal Title: The transport and dispersion of rafting vegetation in the Sacramento−San Joaquin Delta

Proposal Number: 0053

Proposal Applicant: Berkeley, California University of

Purpose

Comments	**The goals and objectives are clearly stated (excellent). Predicting the transport and dispersion of raft vegetation is critical to manage invasive exotic species. The research is a pilot project for determining mechanism that controls the transport and dispersion of vegetation raft. The study is a continuous project of two prior CALFED funded projects. And it aims to develop novel knowledge relating to the transport of vegetation rafts.**
Rating	**Superior**

Background

Comments	**The conceptual model explained the underlying basis for the proposed work. The reviewer has several questions: 1) how significant the vegetation rafts in transporting and dispersing seeds (or others)? Based on marine biology, are vegetation rafts the fundamental reason that results in the wide−spread of exotic invasive species? 2) What is the mechanism that generates vegetation rafts in streams? Does the population of vegetation rafts increase as water quality declines? 3) How serious the vegetation rafts in channels or delta areas? The mechanistic principles governing the transport of vegetation raft were stated clearly, which demonstrated the qualifications of the investigators. There is a lack of background information (e.g. generation of vegetation rafts, bio−impacts, or current conditions).**

Rating	**Above Average**

Approach

Comments	**The approaches include field experiments, numerical studies, and theoretical analysis presented in the proposal. Especially, the field tracking and measurements of vegetation rafts will be very valuable. This integrated approach will achieve the desired project goals. There is one month summer salary allocated to the PI for managing this project. The product for predicting vegetation raft is valuable for larger data management. The proposal lacks a detail plan on how to disseminate data effectively.**
Rating	**Above Average**

Feasibility

Comments	**The approach is fully documented and technically feasible. The proposed 2D hydrodynamic model should have the capability simulating wind and tidal forcing. Additionally, the floating of vegetation rafts will affect the hydrodynamic model by introducing additional surface forcing. It is needed to study the vegetation species on the rafts and develop a model to address the resistance of these rafts. The project is likely to be successful. The project is a pilot demonstration project and is within the grasp of the PI.**
Rating	**Above Average**

Budget

Comments	**The budget is slightly low comparing to the efforts proposed. There are three field sites in addition to numerical modeling effort. The PI has a successful record in conducting projects, so the reviewer believes the PI can complete all the tasks.**

Rating	**Inadequate**

Relevance To CALFED

Comments	**The proposal addresses the dynamics of biological invasions (stated in PSP), including existing and future conditions. The proposed project is focusing the physical process of vegetation rafts and will provide knowledge for biological and ecologic studies. The ultimate product and information is useful to CALFED managers and policy makers. However, this section was not emphasized in the proposal.**
Rating	**Sufficient**

Qualifications

Comments	**The PI has a track record in conducting projects funded by CALFED, especially in marine vegetation. Results from prior funded CALFED projects are well published in peer−reviewed journals. The team, the PI and students, is qualified for the proposed research. Additional personnel help maybe necessary for the field investigations. The infrastructure (ADV, ADCP) are available to the research team.**
Rating	**Superior**

Overall Evaluation Summary Rating

Comments	**The proposal addresses an important topic that fits very well with CALFED program mission. The proposal is technically well−defined, and included extensive background information. The approach of integrating field studies and numerical models is feasible. The PI has an excellent track record in conducting federal funded projects. The weakness of the proposal is lacking some biological aspect and the budget is low.**
Rating	**Above Average**

External Technical Review #3

Proposal Title: The transport and dispersion of rafting vegetation in the Sacramento−San Joaquin Delta

Proposal Number: 0053

Proposal Applicant: Berkeley, California University of

Purpose

Comments	*** Goals, objectives, and hypotheses are clearly stated. * Proposed work would provide useful information for understanding the transport of vegetation rafts formed by invasive species, which may also act as vectors of dispersal for other species. * The proposal states that their results will complement existing knowledge concerning raft transport the SFB Delta. It would have been useful if the authors were more specific when describing the current state of knowledge and how their work will fill in gaps in that knowledge base. * Provided that this study would complement existing knowledge, results from the project could generate novel infomation concerning dispersal of vegetation rafts at the confluence of various waterbodies. * While this study would be interesting, I wish the authors provided stronger justification for their approach, especially because of the limited finances available to support research. It is difficult to evaluate whether this project will yield the best return for the CalFed program. This is especially true because few details regarding the collection of the calibration data.**
Rating	**Above Average**

Background

Comments	**The PI provides a clealy stated conceptual model. Additional background material highlighting the current state of knowledge**

	regarding vegetation raft transport would be useful.
Rating	**Above Average**

Approach

Comments	**The approach is fairly well laid out. It would have been helpful if the PI provided additional details describing the spatial and temporal scales at which field data will be collected. It also would have been helpful to highlight the advantages and disadvantages of using numerical models. The proposal did not include discussion of model verification or uncertainty analyses.**
Rating	**Above Average**

Feasibility

Comments	**The scale of the proposed project seems feasible and consistent with the stated objectives. Additional details pertaining to the collection of field data and the resolution of the model would be useful.**
Rating	**Above Average**

Budget

Comments	**The PI provides a very reasonable budget that essentially requests funds only for employee salary and benefits plus publication and presentation expenses. The PI has offered to use his lab equipment and resources to cover other expenses.**
Rating	**Superior**

Relevance To CALFED

Comments	**The proposal to model transport of invasive plant species fits squarely with priorities stated by the CALFED PSP.**

	It would have been helpful if the PI provided more background about the existing state of knowledge to evaluate how useful the results from this exercise will be. While it's definitely a cool project idea, the resulting model seems like it would have a limited capacity to assess the impact of different management strategies... unless stream flow of the various tributaries are controlled significantly enough to alter flow patterns across the estuary?
Rating	Above Average

Qualifications

Comments	The PI has excellent credentials and strong experience in estuarine circulation modeling.
Rating	Superior

Overall Evaluation Summary Rating

Comments	Overall, this is a strong proposal that could provide interesting information at a reasonable and fair price. There are some missing details that would have improved my ability to evaluate how useful the proposed project could be for CALFED. Given the strong credentials and experience of the PI and the reasonable budget, I believe this proposal to be a worthwhile investment.
Rating	Above Average